

# **THE ARMY'S OPERATIONAL LOGISTICS DOCTRINE FOR THE TWENTY-FIRST CENTURY**

**A MONOGRAPH  
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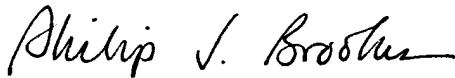
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## **ABSTRACT**

The Army's Operational Logistics Doctrine For The Twenty-First Century, Major Kent S. Marquardt, USA, 42 Pages.

Currently, there is no Army operational level logistics doctrine. Since Army logistics has responsibility for prompt and sustained support, operational logistics doctrine should be applicable to all areas that fall under the Army's responsibility to provide logistics support for itself, other services, allies, and agencies. Army operational logistics doctrine should link the foxhole to the industrial base and encompass the ability to anticipate and improvise based upon the situation.

The methodology of this paper considers several things. First, it defines the different levels of war and logistics as specified in joint doctrine. Next, it shows how doctrine is derived and how the manuals present doctrine. Third, it compares fundamental logistics precepts presented in current Army manuals and Joint Publications. Finally, current logistics doctrine is evaluated against criteria established in TRADOC Pam 525-5, Force XXI Operations: A Concept for the Evolution of Full Dimensional Operations for the Strategic Army of the Early Twenty-First Century in order to discern the best Army logistics doctrine at the operational level. The following questions are answered:

- 1) What is operational logistics?
- 2) What are the levels of war, as they apply to Army logistics?
- 3) What is doctrine and how does it fit into the Army's operational context?
- 4) What guides the contents of Army manuals?
- 5) How do these manuals fit into the structure of logistics doctrine?
- 6) What is the difference between logistics doctrine in joint and Army manuals?
- 7) How does this doctrine compare against evaluation criteria established by Training and Doctrine Command (TRADOC)?
- 8) What should be the operational logistics doctrine for the Army?
- 9) In what manual should this operational logistics doctrine reside?

The intent of this paper is to fill a void that exists between Joint and Army logistics doctrine. It compares Joint and Army doctrine and provides a recommendation for change that will support the Army as a whole. Since it supports the Army as a whole, it is consistent with the linkage between Army tactical doctrine, the National Security Strategy (NSS), National Military Strategy (NMS), and Joint doctrine. Finally, this paper recommends which publication should contain Army operational logistics doctrine and the basic contents of Army logistics doctrine at the operational level.

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**CHAPTER I:**  
**INTRODUCTION**

“Whether we look at Roman legions or Star Trek, there will always be logistics. While most of us share this philosophy, the challenge is how to continue giving soldiers the right equipment, munitions and supplies when and where they need them.”

GEN Johnnie E. Wilson  
Commander, US Army Materiel Command  
Army Magazine, February 1999<sup>1</sup>

No one denies that the security environment facing the Army is unpredictable. For the first time in the history of our country, we have no near-peer military competitor. This situation makes for widespread ambiguity and uncertainty. It is further exacerbated by the changing world environment. Last, the growth of communications abilities add a new dimension to the possibilities of future Army requirements and capabilities. The Army must be able to respond to these requirements across a wide spectrum of possibilities. This spectrum runs from peacetime engagement operations and Military Operations Other Than War (MTOOW) to asymmetric threats, such as terrorism, or two near-simultaneous Major Theater Wars (MTW).

Title 10 United States Code (USC) guides the Army's responsibilities to the nation. Title 10 establishes the requirement that the Army “be organized, trained, and equipped primarily for prompt and sustained combat incident to operations on land.”<sup>2</sup> In

support of this mandate, the Army must be able to operate in a joint, combined, and interagency environment. Additionally, since the Army is required to conduct both immediate and sustained land combat, there are certain capabilities that only the Army can provide. Other services, allies, governmental and non-governmental agencies will require Army support which will be dependent on the particular situation. In order for the Army to support these myriad of situations, its logistics doctrine must therefore be flexible and comprehensive.

The Army's logistics doctrine developed for the twenty-first century needs to be definite and explicit. Doctrine dictates training, organization, and equipment procurement so it should be applicable to every conceivable situation. Logistics doctrine must be authoritative but require responsiveness and judgment in application. Currently, the key components of the Army's logistics doctrine are contained in four documents:

- \* FM 100-5, Operations
- \* FM 100-7, Decisive Force
- \* FM 100-10, Combat Service Support
- \* FM 100-16, Army Operational Support

The logistics doctrine contained in these manuals is written for the combat commander and logistician.

Joint and combined logistics doctrine is contained in Joint Publication (JP) 4.0, Logistics. This doctrine is useful, but does not specifically address the Army's mission of prompt and sustained land combat. There is a void. Army doctrine for supporting

such combat above the tactical level does not exist. This paper will present the different levels of war, tactical, operational, and strategic, as they apply to logistics.

Logistics doctrine for land combat at the operational level must be all-encompassing. It must provide guidance that is thorough and complete. Since the Army is in a state of transition, this logistics doctrine should be universally applicable for current and future systems. Regardless of the type of operation, this doctrine should focus on mobilization, force projection, and sustainment of land combat.

Army logistics has responsibility for prompt and sustained support. Therefore, it should contain logistics doctrine that is applicable to all areas that fall under the Army's responsibility. This includes providing logistics support, in certain situations, to sister services, allies, and other agencies. Also, logistics doctrine should link the foxhole to that of the industrial base and, when needed, anticipate and improvise based upon the situation.

The methodology of this paper considers several things. First, it defines the different levels of war and logistics as specified in joint doctrine. Next, it shows how doctrine is derived and how the manuals dictate and present doctrine. Third, it compares fundamental logistics precepts presented in current Army manuals and Joint Publications. Finally, current logistics doctrine is evaluated against criteria established in TRADOC Pam 525-5, Force XXI Operations: A Concept for the Evolution of Full Dimensional Operations for the Strategic Army of the Early Twenty-First Century, in order to discern the best Army logistics doctrine at the operational level.

The following questions will be answered:



- 1) What is operational logistics?
- 2) What are the levels of war, as they apply to Army logistics?
- 3) What is doctrine and how does it fit into the Army's operational context?
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Training and Doctrine Command (TRADOC)?

- 8) What should be the operational logistics doctrine for the Army?
- 9) In what manual should this operational logistics doctrine reside?

Ultimately, the intent of this paper is to fill a void that exists between Joint and Army logistics doctrine. It compares Joint and Army doctrine and provides a recommendation for change that will support the Army as a whole. Since it supports the Army as a whole, it will be consistent with the linkage between Army tactical doctrine, the National Security Strategy (NSS), National Military Strategy (NMS), and Joint doctrine. These national planning mechanisms dictate the entire issue of doctrine. Finally, this paper will recommend which publication should contain Army operational logistics doctrine and the basic contents of Army logistics doctrine at the operational level.

## **CHAPTER II**

### **THE LEVELS OF LOGISTICS**

“(General) DePuy’s use of the term operational along with strategic and tactical is indicative of a growth in conceptual framing that would have a significant influence on the direction of Army doctrine. It is one indication that thoughtful officers were starting to look for a way to find expression for a level of activity that would connect tactical actions and strategic purposes.”

“Filling the Void: The Operational Art and the U.S. Army”  
Dr. Richard M. Swain on the writing  
of FM 100-5, Operations (1983)

An interesting debate would arise by asking a military person about his or her definition of the levels of war. Most will identify that there are three; tactical, operational, and strategic. However, having those military persons define the three levels would yield varied results. In military theory, the definitions of the levels of war are distinct; certain nuances, however, cause them to overlap. The levels of war are separate yet intertwined. The Joint Doctrine Encyclopedia defines them as “doctrinal perspectives that clarify the links between strategic objectives and tactical actions. Although there are no finite limits or boundaries between them, the three levels...apply to...war and operations other than war.”<sup>3</sup>

A definition of each level and a discussion on their relevance is important to Army doctrine because currently there is a void linking tactical and strategic

## LEVELS OF WAR

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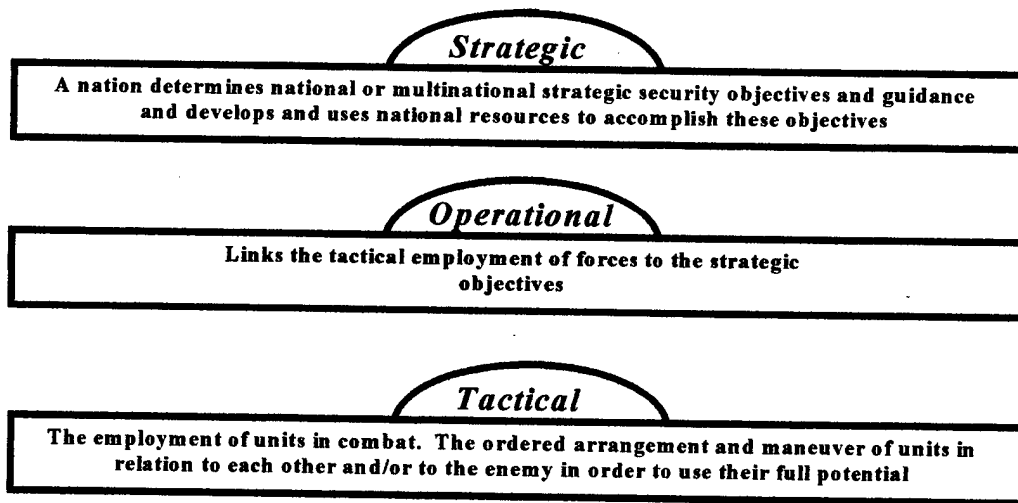


Figure 1<sup>4</sup>

logistics. The strategic level of war is defined by the Joint Doctrine Encyclopedia as:

“...that level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) strategic security objectives and guidance and develops and uses national resources to accomplish these objectives. Strategy is the art and science of developing and employing armed forces and other instruments of national power in a synchronized fashion to secure national of multinational objectives. The National Command Authorities (NCA) translate policy into national strategic military objectives. These military objectives facilitate theater strategic planning.”<sup>5</sup>

The operational level is:

“...(the level that) links the tactical employment of forces to strategic objectives. The focus at this level is operational art - the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art determines when, where and for what purpose major forces will be employed and should influence the enemy dispositions before combat. It governs the deployment of those forces, their commitment to or withdrawal from battle, and the arrangement of battles and major operations to achieve operational and strategic objectives. Operational art helps commanders use resources efficiently and effectively to achieve strategic objectives. It provides a framework to

assist commanders in ordering their thoughts when designing campaigns and major operations.” “Operational art requires broad vision, the ability to anticipate, and effective joint and multinational cooperation. Operational art is practiced not only by joint force commanders but also by their senior staff officers and *subordinate commanders*.”<sup>6</sup>

The tactical level is:

“...the employment of units in combat. It includes the ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to use their full potential. An engagement is normally short in duration and fought between small forces, such as individual aircraft in air-to-air combat. Engagement include a wide variety of actions between opposing forces in the air, on and under the sea, or on land. A battle consists of a set of related engagements. Battles typically last longer, involve larger forces such as fleets, armies, and air forces; and could affect the course of a campaign.”

Joint doctrine directs that “(t)he Services and the subordinate commander down to their

battlefield logisticians at the unit and ship level, deal with operational and tactical logistic responsibilities, including developing procedures, *doctrine*, and training for supplying personnel with all necessary materiel to do their jobs.”<sup>7</sup> Additionally, Joint

doctrine identifies three elements of the logistics system. The first is lines of communications (LOCs), which span the levels of war from tactical to strategic. LOCs consist of all “routes (land, sea, and air) that connect an operating military force with a theater base of operations and along which supplies and military forces move.” A LOC is the operational commanders link from the US strategic base to the tactical forces on the ground conducting operations. Second, is the theater transportation network. This consists of the ports, bases, airports, rail heads, pipeline terminals, and trailer transfer points that serve as the inter-modal links points for the LOCs. Logistics units

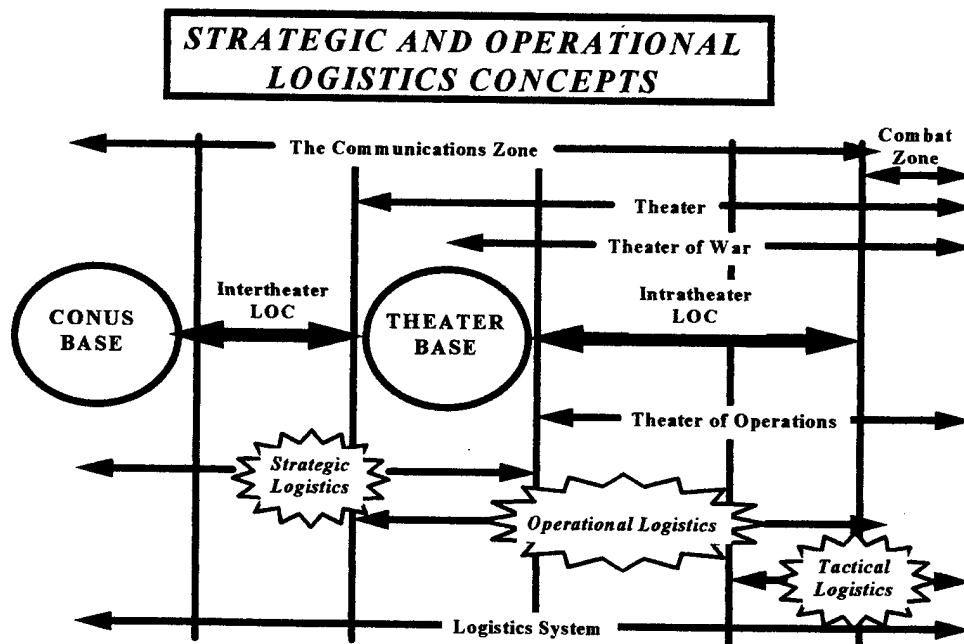


Figure 2<sup>8</sup>

operate each of these nodes. Last, host nation support is..."desired civil and military assistance from allies that includes: enroute support, reception, onward movement, and sustainment of US forces."<sup>9</sup>

The levels of war are directly linked to the levels of logistics. As with the levels of war, the levels of logistics are identical; strategic, operational, and tactical. Joint doctrine does not differentiate. However, Marine Corps Doctrinal Publication 4, Logistics, shows "levels of logistics"<sup>10</sup> that cut across the levels of war. The levels of logistics seem to be largely a matter of scale. Strategic logistics requirements are greater than operational logistics requirements. Operational logistics requirements are greater than tactical logistics requirements. The effective support of Army operations requires

the successful conduct and integration of logistic activities at all three levels. Figure 3 shows some of the tasks conducted at each level.

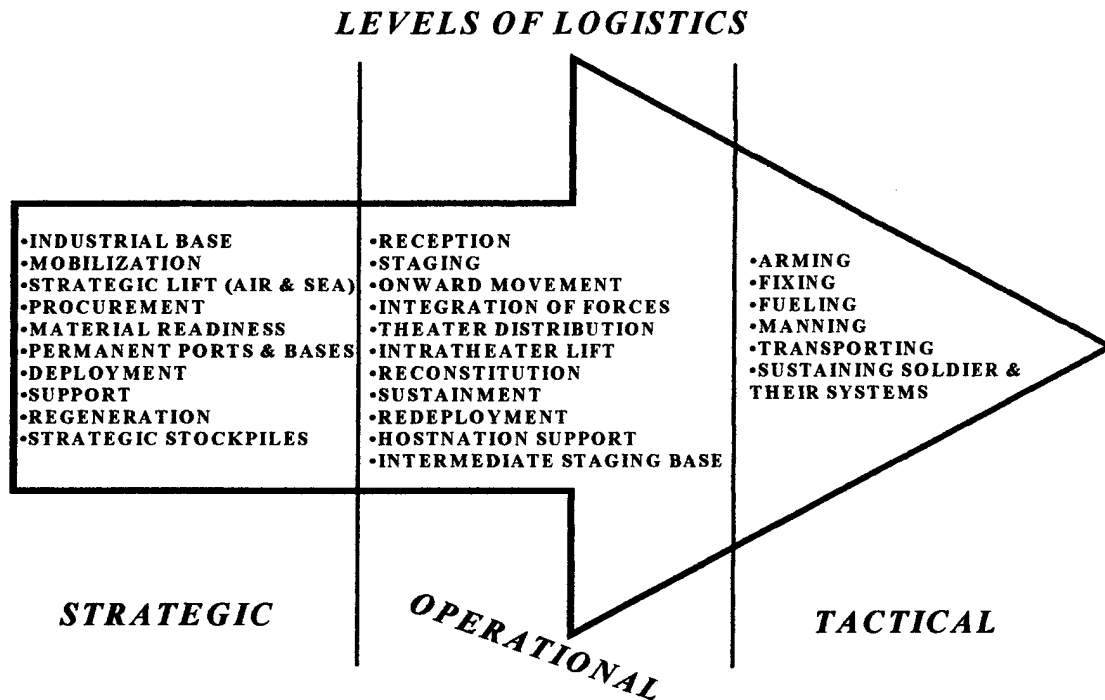


Figure 3

All of these levels and networks require logistical involvement. The Army will be required to operate the networks in order to conduct prompt and sustained land warfare. Therefore, logistics doctrine at the operational level must provide the Army forces with principles that can be applied to the tasks in figure 3 and be adaptable to a myriad of situations.

### **CHAPTER III**

#### **THE MANUALS**

**“Doctrine—**Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.”

Joint Publication 1-02  
DOD Dictionary of Military and Associated  
Terms<sup>11</sup>

#### **Introduction.**

The Field Manuals of the U. S. Army explain the beliefs of the Army on the conduct of war. While they are prescriptive, they remain flexible enough to apply to every situation that the Army might face. If the conduct of war is the Army’s primary *raison d’etre*, then war should be the focus of doctrine. However, the Army is also confronted with a plethora of secondary missions, many that don’t even approach the definition of war. The international situation is ever-changing and the Army must have the capability to adapt to many different events.

Amidst these situations, the Army Forces (ARFOR) Commander must conduct operations that link national strategic objectives within theaters or areas of operations. The logistics doctrine that guide his actions must allow him to “attain strategic and operational objectives within the theater through the design, organization, integration, and conduct of theater strategies, campaigns, major operations and battles.”<sup>12</sup>

## Doctrine.

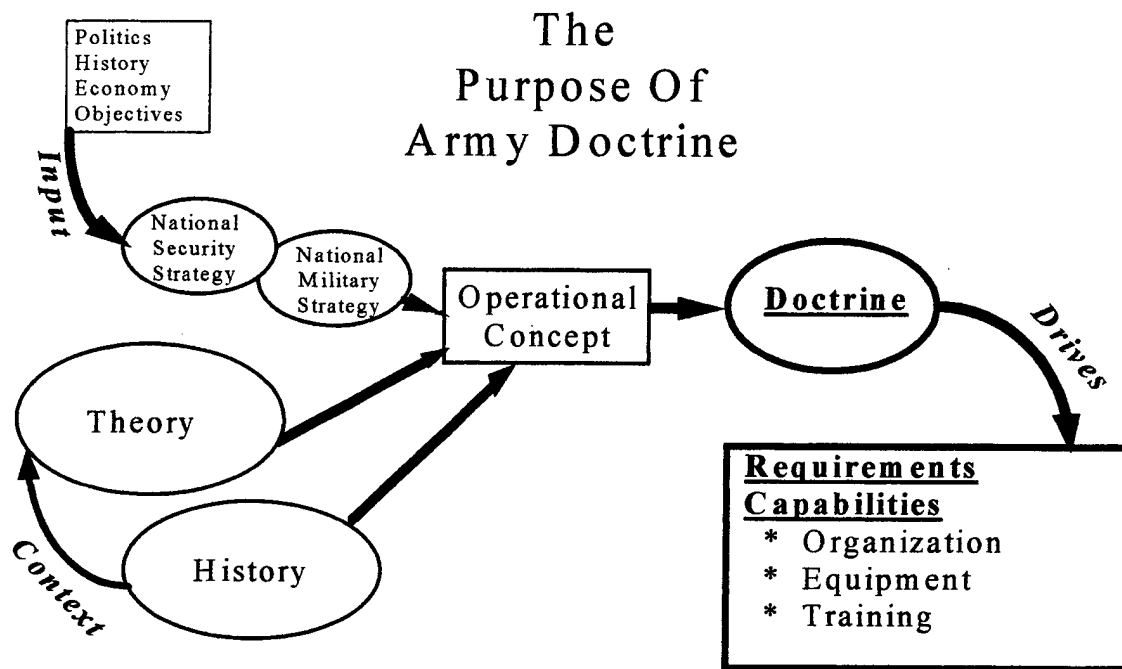


Figure 4

Figure 4 explains the purpose of U. S. Army doctrine. The three inputs to the left guide the development of operational concepts. The National Security Strategy (NSS) and National Military Strategy (NMS) are influenced by several different elements. Among these elements are politics, history, economics, and national objectives. History provides a context for military theory. Through this context of history, military theorists guide how our institution understands land conflict. From this understanding is derived the operational concept for land warfare. This operational concept is codified into doctrine. Doctrine serves as a framework and is not be prescriptive or directive. It entails the fundamental principles that guide the missions and actions of the Army. Next,



doctrine dictates the institution's requirements and capabilities. The requirements become operational tasks (see Chapter 2, Figure 3) that the Army can expect to encounter leading up to, in the execution of, and concluding an operation. These requirements, driven by doctrine, guide the building of the Army. This methodical system results in the capabilities of the Army. Finally, the capabilities of the Army revolve around the three pillars: organization, equipment, and training. The building and management of these pillars are the responsibility of the Army Service Component Commander (ASCC). He provides organized, trained, and equipped land forces to the CINC or ARFOR. This whole system is vital to maintaining a viable and effective institution.

#### **Publications.**

### **Where Does Army Operational Logistics Doctrine Fit?**

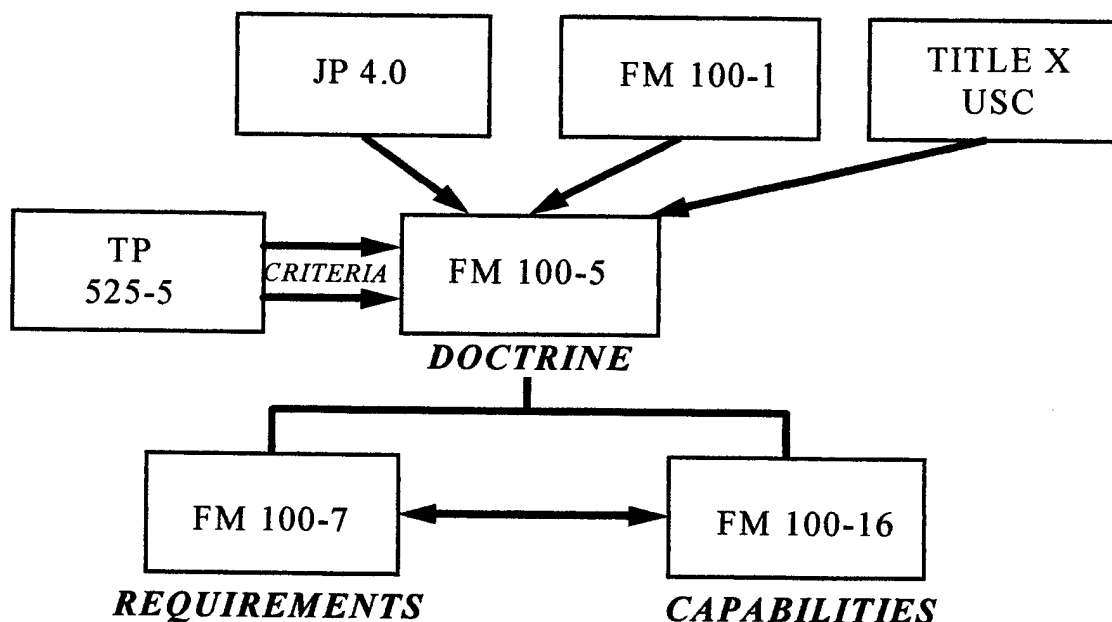


Figure 5

Figure 5 depicts the documents that shape the logistics portion of FM 100-5 and the complementary documents to FM 100-5. TRADOC Pamphlet 525-5, establishes the guidelines for the U. S. Army land force of the twenty-first century. It provides the criteria for the development of U. S. Army doctrine for the Force XXI Army. "TRADOC Pam 525-5 sets forth future full-dimensional operations for Force XXI--a strategic Army that will continue to provide staying power on land as part of the joint team to meet our (n)ation's future national security requirements."<sup>13</sup> This document serves as the baseline for future concepts and provides broad training guidance, not doctrine. TRADOC Pam 525-5 provides this guidance by lending focus to, and criteria for, evaluating the doctrine for FM 100-5. It's wording strongly implies that building the precepts of FM 100-5 is one of its intended purposes.

Other documents guide the development of the operational logistics portion of FM 100-5. First, Joint Publication 4.0, Doctrine for Logistic Support of Joint Operations provides the basic logistics doctrine for joint operations. Army logistics doctrine must nest with joint doctrine because the Army will almost never conduct operations without the sister services. Second, FM 100-1, The Army, "...expresses the Army's fundamental purpose, roles, responsibilities, and functions, as established by the Constitution, Congress, and the Department of Defense. As the Army's "cornerstone" document, FM 100-1 defines the broad and enduring purposes for which the U. S. Army was established and the qualities, values, and traditions that guide the U. S. Army in protecting and serving the (n)ation."<sup>14</sup> Finally, Title X, U. S. Code provides broad guidance on the responsibilities and functions of the U. S. Army. These functions and responsibilities are

codified in Department of Defense Directive 5100.1, Functions of the Department of Defense and its Major Components.<sup>15</sup> The law requires that the U. S. Army provide sustained land force support to the other services in specific areas. These support requirements might include, but are not limited to, long term fuel and water support, mortuary affairs, and port construction and operations.

FM 100-7, Decisive Force: The Army in Theater Operations, must establish key logistical tasks (requirements) that the ASCC must prepare the Army to conduct. These tasks may include mobilization, deployment, reception, staging, onward movement, and integration (RSOI), force sustainment, combat service support, operational reach, joint sustainment, multinational sustainment, and demobilization. Finally, FM 100-16, Army Operational Support, must address the capabilities that the ASCC can provide to the ARFOR. This manual should be structured and built upon the doctrine in FM 100-5 and support the requirements of FM 100-7. The elements in this manual provide the ASCC and ARFOR Commander with the tools to execute operational logistics support to the theater. Examples of the contents of FM 100-16 are:

- 1) Theater organization and structure.
- 2) Responsibilities, planning, and support.
- 3) Supply, maintenance, and field services.
- 4) Transportation.
- 5) Personnel support.
- 6) Combat health support.

7) Signal, intelligence, electronic warfare, civil-military and psychological support.

8) Engineer support.

9) Security and rear operations.

FM 100-16 is currently written as outlined above.<sup>16</sup> However, the operational logistics portion of the current FM 100-7 devotes four pages to operational logistics. These four pages provide a brief overview of operational support requirements for the ARFOR Commander. In addition, CSS Characteristics and Tactical CSS Functions (that are also found in FM 100-10, Combat Service Support) are part of this portion of the manual. Finally, Appendix A of FM 100-16 details Army Service Component Command Responsibilities and Organization which includes the logistical construct of the theater.<sup>17</sup>

#### **Conclusion.**

Doctrine is based on the operational concept gained from the NSS/NMS, theory, and experience or history. Doctrine drives the requirements (tasks) and building of the Army (capabilities). The ASCC uses the concepts of training, organizing, and equipping to provide the ARFOR with a viable fighting force. Since doctrine should provide broad principles to evaluate operational level logistics, the operational logistics doctrine that is found in FM 100-5 should be applicable to the land component commander (LCC). In the Army, this is the ARFOR Commander. Therefore, FM 100-5 should be written to provide operational logistics doctrine for the ARFOR Commander and his staff.

The logistics section of FM 100-5 is determined by TRADOC Pam 525-5, with input from JP 4.0, FM 100-1, and Title X USC. Therefore, FM 100-5 should provide the

ARFOR Commander with the logistics doctrine on how to execute an operational campaign. FM 100-7 should provide doctrine for tasks that an ARFOR Commander and logistician, at the operational level, might have to plan or conduct. FM 100-7 should establish the requirements while FM 100-16 should provide the training, organization, and equipment (capabilities) that the ASCC provides to the ARFOR.

## CHAPTER IV

### LOGISTICS DOCTRINE

“Americans in 1950 rediscovered something that since Hiroshima they had forgotten: you may fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life--but if you desire to defend it, protect it, and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men into the mud.”

T. R. Fehrenbach  
This Kind Of War<sup>18</sup>

#### **Background.**

Currently, doctrine for U. S. Army logistics is found in chapter 12 of the U. S. Army's keystone doctrinal manual, FM 100-5. It provides logistics doctrine across the spectrum of conflict; strategic, operational, and tactical. This logistics doctrine provides a firm foundation upon which a logistician can plan logistical estimates and evaluate different courses of action during the Military Decision Making Process (MDMP). Having that firm foundation of logistics doctrine is a combat multiplier for the ARFOR Commander and staff. It provides a systematic way to ensure that the requirements of the warfighter are matched with the capabilities of the logistician. When required, the logistician can then identify them to the commander in order to attempt filling any shortfalls in support. Arguably, the most important logistical doctrine revolves around the five logistics characteristics of anticipation, integration, continuity, responsiveness,

and improvisation. When framed with the six tactical logistical functions of man, arm, fuel, fix, move, and sustain the logistician can ensure that none of the characteristics are violated when evaluating a course of action. Logisticians use the characteristics to evaluate whether an operational maneuver course of action is feasible, acceptable, and suitable, from a logistical standpoint.<sup>19</sup> Most importantly, the characteristics provide a framework from which the logistician can make recommendations to the commander on the best course of action (COA). Since TRADOC Pam 525-5 dictates criteria for evaluating twenty-first century doctrine, this chapter will evaluate how the current doctrine in FM 100-5 holds up under the scrutiny of these criteria.

Since FM 100-1 establishes overarching purpose and Title X USC directs, they are not useful in establishing Army operational logistics doctrine. FM 100-7 and FM 100-16 as, described in Chapter II, do not dictate but rather are driven by FM 100-5. Therefore, the only two documents that provide a basis for analysis of Army operational logistics doctrine are the current edition of FM 100-5 and JP 4.0. Finally, doctrine, by joint definition, must include “fundamental principles” and be “authoritative but requires judgment in application.”<sup>20</sup> Therefore, the analysis of what should be U. S. Army operational logistics doctrine will focus on principles or characteristics of logistics and the logistics functions.

**Focus.** TRADOC Pam 525-5 lays out the five characteristics of the force of the next century. At this point it is useful to keep in mind the effects that the mixed legacy

and digitized force has on the U. S. Army's logistical doctrine. Some of these key effects will be entirely dependent upon capabilities of digitization, that is, logistical enablers that will facilitate information dominance. This is most important, because the desired doctrinal effects are influenced by information-age technologies that will be available to the digitized force. However, it is equally important to realize that this doctrine must apply to the future digitized force and the transitional legacy force. Legacy forces are the forces as they are currently organized, trained, and equipped. This definition includes the current equipment (i.e., Abrams tanks and Bradleys) that will always be vastly inefficient consumers of ammunition, fuel, and maintenance. Legacy forces will train and organize around the division and brigade. This will remain a truism until some unforeseen force either provides the resources or makes the resources become available to allow the force to transition, in total, to the Army that will not require the organization that exists today. As it currently stands, there will be no stimulus to make a complete leap from the legacy systems to the force of the twenty-first century. Therefore, there will be much overlap and logistics doctrine needs to take this into account.



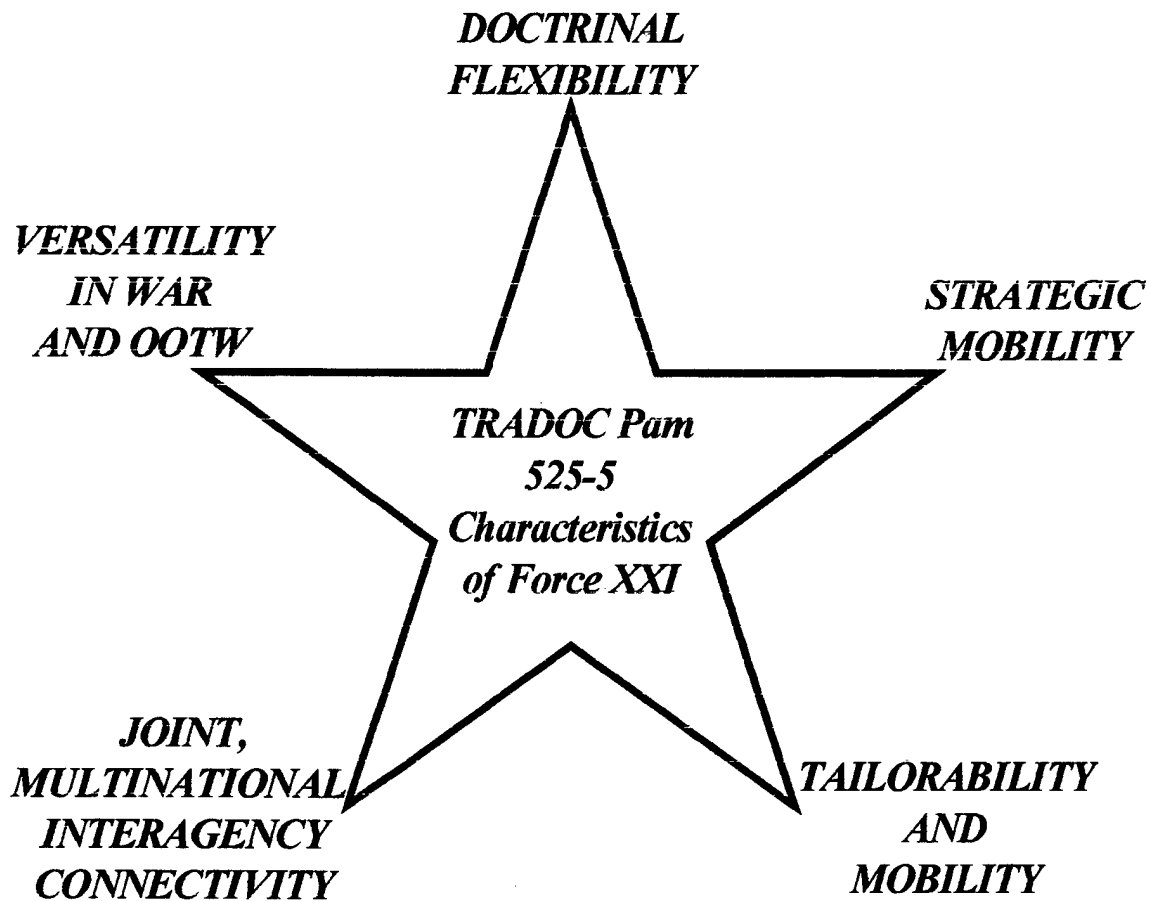


Figure 6

The characteristics for doctrine for the twenty-first century force *are doctrinal flexibility, strategic mobility, tailorability and mobility, multinational, interagency connectivity, and versatility in war and MOOTW.*

*Doctrinal flexibility* is "...the strategic landscape will be varied and multifaceted and have a great potential for surprise across the operational spectrum. In addition, future adversaries may possess technology equal to or, in some cases, superior to our own. At the center of this flexible doctrine are our quality leaders and soldiers. Practiced in application of principles in varied scenarios, our soldiers and leaders will be

able to continually adapt tactics, techniques, procedures, and organizations to meet future requirements.”<sup>21</sup>

The **evaluation criterion** for *doctrinal flexibility* is that any operational logistics doctrine must apply to broad situations. It must be flexible and responsive in order to respond to changing situations and different scenarios.

*Strategic mobility* “is about being at the right place at the right time with the right capabilities. It is about a combination of anticipation, movement, and skillful pre-positioning. Lethality and survivability of early entry forces will continue to be a main focus. Making forces lighter and able to reach deeper, while not sacrificing lethality and survivability also is required. In addition, initiatives should concentrate on those parts of mobility capable of improvement through use of new information systems, split-based operations and broadcast intelligence, or information concerning other battlefield functions. Shared knowledge will improve deployability through smaller, more precise tailoring of combat units and support requirements to accomplish the wide variety of missions expected of our force-projection Army. Strategic mobility implies “devot(ing) much energy toward the synergy to be gained from actual rapid movement of lethal and survivable early entry forces, increasing the ability to lift these forces by increasing strategic lift capability through investment in sealift, airlift, pre-positioning, and infrastructure improvement and by measures to assist in anticipating possible commitments.”<sup>22</sup>

The **evaluation criterion** for *strategic mobility* is providing minimum essential supplies and services required to begin combat operations. The ARFOR Commander

must continually prioritize and adjust resources in order to provide support with limited resources.

*Tailorability and Modularity* are "...forces that are as modular as logic allows to facilitate tailoring to meet each contingency."<sup>23</sup>

The **evaluation criterion** for *tailorability and modularity* is that there must be efficiency in planning and execution. Logistical units may be restricted in lift assets, time limits, or other things which require units and doctrine that accommodates the ability to pull a capability from a unit and plug it into another unit.

*Joint, Multinational, and Interagency Connectivity* is the precept that "(t)he Army must continue to improve its contribution to joint and interagency operations."<sup>24</sup>

The **evaluation criterion** for *joint, multinational, and interagency connectivity* means that FM 100-5 must contain doctrine that conforms with JP 4.0.

*Versatility in War and MOOTW* is "(w)ell-trained and disciplined units, provided with sufficient time and resources to train, can transition to (M)OOTW missions as required."<sup>25</sup>

The **evaluation criterion** for *versatility in war and MOOTW* is that Army logistical doctrine must support operations across the spectrum. It must provide for sustainment of full-scale operations over indefinite periods and it must identify the requirement of force protection.

These characteristics will be used to evaluate the current logistical doctrine in FM 100-5 and JP 4.0.

**Logistics Characteristics (FM 100-5).**

The current edition of FM 100-5 contains the traditional logistics characteristics of:

*Anticipation*, which means “identifying, accumulating, and maintaining the assets and information necessary to support operations at the right time and place. Anticipation also means developing logistics capabilities that are versatile and mobile enough to accommodate likely operational or tactical events.”<sup>26</sup>

*Integration* means that the logistical concept gives the commander the “greatest possible freedom of action and enhances the agility and versatility of an operation.” This includes being bold and innovative and operating “as part of joint and combined forces, integrating support operations”<sup>27</sup> in order to yield efficiencies that may not otherwise be achievable.

*Continuity* requires that the logistics effort be robust enough to provide the commander with continuous support. The logistics plan and subsequent support execution must be adaptive and flexible enough to handle changing missions and priorities quickly.

*Responsiveness* requires that the logistics system adapt rapidly. Tailoring organizations will be required. “Responsive logistics, especially when time or other resources are constrained, relies greatly on worldwide, assured communications and automation networks.”<sup>28</sup>

*Improvisation* “is the talent to make, invent, arrange, or fabricate what is needed out of hand.”<sup>29</sup> Operational level logistics is very inflexible because of the tremendous quantities of supplies and equipment used by the land forces. These amounts of materiel,

once set in motion, are extremely difficult to change or adjust. These facts make improvisation the most important logistic characteristic, at the operational level.

The characteristics of logistics “enable operational success. They apply to war and (military) operations other than war.”<sup>30</sup>

#### **Tactical Logistics Functions (FM 100-5).**

The tactical logistics functions are manning, arming, fueling, fixing, moving, and sustaining soldiers and their systems.

*Manning* is the systems of “personnel readiness management, replacement management, and casualty management (which) meet the Army personnel requirements from mobilization and deployment through redeployment and demobilization.”<sup>31</sup>

*Arming* includes all phases of deployment and employment. “It begins with peacetime planning and covers all phases of force-projection. The key to arming soldiers in the field is planning for a flexible logistics distribution system capable of surging for the main effort.”<sup>32</sup>

*Fueling* furnishes fuel to the high performance air and ground vehicles of the Army and give “great potential mobility for both heavy and light forces, they also consume large quantities of fuel.” “Whether combat, CS, or CSS, all units require uninterrupted fueling to function effectively.”<sup>33</sup>

*Fixing* maximizes equipment availability and “is a necessity in supporting a force-projection Army.” “Repairing equipment far forward is the key. A tailored maintenance capability will deploy, move with, and redeploy with supported units. Modular support team will provide additional capabilities. Battle damage assessment

and repair (BDAR) provides the capability to quickly repair and return equipment to combat...<sup>34</sup>

*Moving* soldier, supplies, and equipment “rapidly and in sufficient quantities to support combat operations. Automated systems provide in-transit visibility. The complicating effects of terrain, weather, and enemy interdiction demand well-planned engineer support and great flexibility of transportation planners and operators.”<sup>35</sup>

There are five elements to *sustaining* soldiers and their systems: personnel service support (PSS), health service support (HSS), field service support, quality of life, and general supply support. PSS is the “management and execution of personnel services; resource management; finance services; chaplaincy activities; command information services; and legal service support.”<sup>36</sup> HSS provides “flexible, versatile, and fully modernized HSS units to support the rapid deployment of a CONUS-based, force-projection Army.”<sup>37</sup> Field service support consists of “food preparation, water purification, bakery, clothing and light textile repair, laundry and shower, parachute packing, air item maintenance, rigging supplies and equipment for airdrop, and mortuary affairs.”<sup>38</sup> “Ensuring quality of life is a command responsibility”<sup>39</sup> and includes family support, delivery of mail. General supply support “encompasses the provision of clothing, water, barrier material, and major end item in support of the forces.”<sup>40</sup>

#### **Principles Of Logistics (JP 4.0).**

Joint Publication 4.0 doctrine provides several principles of logistics that are a “guide for analytical thinking and prudent planning”<sup>41</sup> by the combatant commander.

These principles *are responsiveness, simplicity, flexibility, economy, attainability, sustainability and survivability.*

*Responsiveness* is the “keystone” principle and has a basic premise of the “right support in the right place at the right time. (A)ll else becomes irrelevant if the logistical system cannot support the concept of operations of the supported commander.”<sup>42</sup>

*Simplicity* is the “avoidance of complexity. Mission-type order and standardized procedures contribute to simplicity. Establishment of priorities and preallocation of supplies and services by the supported unit can simplify logistic support operations.”<sup>43</sup>

*Flexibility* is the “ability to adapt logistic structures and procedures to changing situation, missions, and concepts of operation. The principle of flexibility also includes the concepts of alternative planning, anticipation, reserve assets, redundancy, forward support of phased logistics, and centralized control with decentralized operations.”<sup>44</sup>

*Economy* is the “provision of support at the least cost. When prioritizing and allocating resources, the commander must continuously consider economy.”<sup>45</sup>

*Attainability* “(or adequacy) is the ability to provide the minimum essential supplies and services required to begin combat operations. The commander’s logistics staff develops the concept of logistical support, completes the logistics estimate, and initiates resource identification based on supported commander’s requirements, priorities, and apportionment. An operation should not begin until minimum essential levels of support are on hand.”<sup>46</sup>

*Sustainability* is “a measure of the ability to maintain logistic support to all users throughout the theater for the duration of the operation. Sustainability focuses the

supporting commander's attention on long-term objectives and capabilities of the supported forces. Long-term support is the greatest challenge for the logistician..."<sup>47</sup>

*Survivability* is the capacity of the organization to prevail in the face of potential destruction. Elements include high-value targets that have a distinct effect on logistics and subsequent "theater operational capabilities."<sup>48</sup> These targets may include "industrial centers, airfields, seaports, railheads, supply points and depots, lines of communication (LOC), shipping, rail and road bridges, intersections," and logistic units and installations. Survivability has two elements. Active measures include ground and air defense. Passive measures include dispersion and decentralization.<sup>49</sup>

#### **Logistic Support Requirements Functional Areas (JP 4.0).**

Joint Publication 4.0 gives a doctrinal logistics framework based on six broad logistic support requirement functional areas that the combatant commander must consider. These are *supply systems, maintenance, transportation, general engineering, health services, and miscellaneous services*.

*Supply systems* "acquire, manage, receive, store, and issue materiel required by the operating forces to equip and sustain the force from deployment through combat operations and their redeployment."<sup>50</sup>

*Maintenance* "includes actions taken to keep materiel in a serviceable condition, to return it to service, or to update and upgrade its capability."<sup>51</sup>

*Transportation* "is the movement of units, personnel, equipment, and supplies from the point of origin to the final destination."<sup>52</sup>



*General engineering* provides the construction, damage repair, and operation and maintenance of facilities or logistic enhancements required by the combatant commander to provide shelter, warehousing, hospitals, water and sewage treatment, and water and fuel storage distribution to enhance provision of sustainment and services.”<sup>53</sup>

*Health services* “include evacuation, hospitalization, medical logistics, medical laboratory services, blood management, vector control, preventive medicine services, and the required command, control, and communications.”<sup>54</sup>

*Miscellaneous services* “are associated with nonmateriel support activities and consist of various functions and tasks provided by service troops and the logistic community that are essential to the technical management and support of a force (i.e., aerial delivery, laundry, clothing exchange and bath, and graves registration).”<sup>55</sup>

#### **Comparative Analysis.**

Analysis between JP 4.0 and FM 100-5 with the evaluation criteria of TRADOC Pam 525-5 will provide systematic reasoning for what the ARFOR Commander’s operational logistical doctrine should be. Theoretically, the functions guide the building of an operational logistics framework and the principles or characteristics evaluate the validity of that framework. Therefore, in FM 100-5, in the text concerning operational logistics doctrine, the functions should, physically, come before the principles or characteristics.

Next, the terms used should be addressed. The term ‘functions’ implies that they specifically apply to actual action, for example, fueling or fixing. The term ‘functional areas’ refers to broad and flexible categories of logistics (*doctrinal flexibility*). These

broad categories will serve the ARFOR Commander in planning and executing an operation or campaign. Therefore, the section of FM 100-5 that dictates the functions of logistics for the ARFOR Commander should be entitled 'Logistics Functional Areas.'

Finally, the term *logistics characteristics* is very useful to the commander at the tactical level. It sets definitive guidance for evaluation of his courses of action, especially applicable to the tactical level. However, it seems to limit the conceptual aspect of the ARFOR Commander. For one thing, it does not allow for a robust level of logistical support evaluation techniques at the operational level. Characteristics imply that the logistics plan must be acted upon a certain way; "typical; distinctive."<sup>56</sup> The term principles is defined as "a *guiding* sense of the requirements."<sup>57</sup> The term characteristics does not take into account general and broad ideas that can be used to evaluate courses of action for the ARFOR Commander. The term *principle* implies flexibility and applicability to changing situations. Additionally, the term *logistics principles* should be used in FM 100-5 in order to comply with the evaluation criteria of *joint, multinational, and interagency connectivity*. In conclusion, the terms *Logistics Functional Areas* and *Principles of Logistics*, while still understood by Army logisticians, would comply with TRADOC Pam 525-5 criteria of *Joint, Multinationality, and Interagency Connectivity*.

Functional Areas.

**FM 100-5  
TACTICAL LOGISTICS  
FUNCTIONS**

**MANNING**

**ARMING**

**FUELING**

**FIXING**

**MOVING**

**SUSTAINING SOLDIERS  
AND THEIR SYSTEMS**

**JP 4.0  
LOGISTIC SUPPORT  
REQUIREMENTS FUNCTIONAL  
AREAS**

**SUPPLY SYSTEMS**

**MAINTENANCE**

**TRANSPORTATION**

**GENERAL ENGINEERING**

**HEALTH SERVICES**

**MISCELLANEOUS SERVICES**

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Figure 7

The evaluation criterion of doctrinal flexibility is critical to the functions. There must be operational logistics functions that are adaptable to any logistical situation that the ARFOR Commander might face. The ARFOR Commander in the theater will have various responsibilities and can be organized many different ways. Appendix A of FM 100-7 describes the different relationships that the ARFOR might have with the ASCC, the combatant commander (CINC), JTC, CJTF, etc.<sup>58</sup> The ARFOR Commander's organization and responsibilities are contingent upon the situation. Therefore, he will need the doctrinal flexibility in order to plan and execute across the spectrum of possible requirements.

The traditional tactical logistics functions are inadequate doctrinal guidance for the ARFOR Commander. They do not provide the doctrinal flexibility necessary to address the breadth of situations that he might face. JP 4.0 functional areas mirror FM 100-5 in the functions of *supply systems (sustaining soldiers and their systems)*, *maintenance (fixing)*, *transportation (moving)*, *health services (manning)*, and *miscellaneous services (sustaining soldiers and their systems)*. An important key function that the ARFOR Commander might have to conduct is *general engineering*. Also, of particular importance to the land component's fight are the tactical logistics functions of *manning* (meaning, personnel replacements operations) and *arming*. Lastly, the functional logistics areas of JP 4.0 do not address the land fighters' concerns about *personnel service support (PSS)*, *quality of life*, and *general supply support*.

Principles of Logistics

**FM 100-5  
LOGISTICS  
CHARACTERISTICS**

**ANTICIPATION**

**INTEGRATION**

**CONTINUITY**

**RESPONSIVENESS**

**IMPROVISATION**

**JP 4.0  
PRINCIPLES OF  
LOGISTICS**

**RESPONSIVENESS**

**SIMPLICITY**

**FLEXIBILITY**

**ECONOMY**

**ATTAINABILITY**

**SUSTAINABILITY**

**SURVIVABILITY**

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Figure 8

The evaluation criteria of *tailorability and modularity, strategic mobility, and versatility in war and MOOTW* are applicable to evaluating the principles of logistics. *Flexibility* is the keystone to the principles. If the ARFOR Commander's plan is not flexible enough to be able to respond to every conceivable situation then he needs to know that he has to accept risk for that course of action. That is the crux of the operational logistician's responsibilities, to advise the commander on the consequences and costs of the course of action. The planning for and subsequent execution of operational logistics involves *foresight and anticipation*. This involves thinking through the logistics functional areas and advising the ARFOR Commander on where there may be difficulties would ultimately cause him to make choices or prioritize support. The

principles of logistics must ensure that the ARFOR Commander has thought through this process. Therefore, it is imperative that the principles of logistics be of use to the staff in the MDMP. They must be well defined in doctrine while at the same time pertinent to the ARFOR Commander and planners.

Currently, FM 100-5 mirrors JP 4.0, as far as principles of logistics in several areas. The definitions of *responsiveness*, *continuity*, and *improvisation* from the present version of FM 100-5 closely parallel with the JP 4.0 principles of *responsiveness*, *sustainability*, and *flexibility*. The next thing to remember is that if the Army is going to meet the TRADOC Pam 525-5 criteria of *strategic mobility and tailorability and modularity*, it must provide minimums of supplies, services, and personnel to execute an operation. In other words, the ARFOR Commander must receive enough logistical support at the right time and place to be effective, while costing the least resources.

*Integration* is still key to the ARFOR Commanders' operational logistics. *Integration* will ensure that the logistics plan is synchronized with the operational plan. Additionally, the FM 100-5 definition of *anticipation* closely resembles the JP 4.0 definition of *simplicity*. The definitions of *simplicity*, *economy*, and *attainability*, while not in FM 100-5 are necessary to enable the ARFOR Commander to be effective in evaluating the operational logistics concept. Finally, *survivability* is key to operational logistics. It requires the ARFOR Commander to consider the requirements to make operational logistics survivable when it comes to active and passive measures in war and MOOTW.

**Title.**

The title of the section in FM 100-5 that provides operational logistics doctrine for the ARFOR Commander can be considered several different ways. However, it should be comprehensive and succinct. Logistics is defined in joint doctrine as:

“The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition, or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services.”<sup>59</sup>

Additionally, combat service support is defined in joint doctrine as:

“The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. Within the national and theater logistic systems, it includes but is not limited to that support rendered by service forces in ensuring the aspects of supply, maintenance, transportation, health services, and other services required by aviation and ground troops to permit those units to accomplish their missions in combat. combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield.”<sup>60</sup>

While considering these two terms, it is necessary to evaluate them against the criteria of *joint, multinational, and interagency connectivity*. Following TRADOC Pam 525-5 guidance, JP 4.0 uses the term *combat service support* as a subordinate element to *logistics*. Additionally, since the combat service support definition refers to the term *sustain*, this implies a prolonged operation which does not fit a MOOTW scenario (this could include an operation for which the National Command Authority (NCA) has not defined an endstate). This violates the evaluation criteria of *versatility in war and MOOTW*. In conclusion, the title of the operational logistics chapter of FM 100-5 should

be *Logistics* because it is more comprehensive and, therefore, useable at the operational level.

### **Conclusion**

A successful operational level logistical plan must adhere to the fundamental principles of the logistics characteristics of U. S. Army and Joint doctrine. Also, there must be changes in the definitions of the logistics characteristics and logisticians must use the changes to these principles to leverage the technology of the information age. The principles of the doctrine are sound. However, they need to be redefined for the mixed force of the twenty-first century. Logisticians must realize that only with the technological enablers in place will the changes to the definitions of the logistics principles be realized.

In conclusion, the *Logistics* chapter of FM 100-5 should address doctrine that supports the Army. It should be entitled *Logistics*. The operational logistics doctrine in this chapter should be called *Logistics Functional Areas* and *Logistics Principles* to ensure that the chapter nests with joint doctrine.



## **CHAPTER V**

### **CONCLUSIONS**

Operational logistics of the twenty-first century will offer challenging opportunities. Problems that have plagued modern armies from World War II to Operation Desert Shield/Storm might be solved. The logistician might finally have the tools that she or he has needed to operate like an efficient late 20th century business; near real time information and the ability to influence operations. However, as long as a single tank requires enormous quantities of fuel and ammunition and as long as soldiers execute the NSS/NMS, the 'fog and friction' of war will require logistics doctrine that is comprehensive and flexible.

Future operational methods will require that operational logistics doctrine blend old principles with new challenges and new capabilities. The new 100-5 needs to focus on principles that are never changing. Broad guidelines that lend themselves to campaigns of highly integrated air, land, sea, space, special operations forces (SOF) and information operations. Future campaigns will require operational maneuver from strategic distances by highly integrated joint expeditionary forces. The operational campaigns of the future will be a new level of precision offensives and highly deterrent defensives plus stability and support operations.

## **Recommendations.**

The next edition of FM 100-5 must contain operational level logistics doctrine that supports the many logistics missions required of the Army of the future. This logistics doctrine should include functions and principles of logistics that enable an operational commander and his staff to construct and evaluate COAs during the MDMP. These principles will enable the commander and staff to test a given COA for feasibility, acceptability, and suitability. The logistics functions will ensure that all operational logistics functional areas are considered and planned.

Based on the guidance from TRADOC Pam 525-5, the tactical logistics functions and characteristics of FM 100-7 do not fully serve the operational commander and his staff. Additionally, the logistics characteristics and principles of logistics in JP 4.0 do not cover all of the areas that concern the Army. Based upon the evaluation criteria contained in TRADOC Pam 525-5, the logistics chapter of the next FM 100-5 must contain the *Operational Logistics Functions* and *Operational Principles of Logistics* in Figure 9 (next page).

**OPERATIONAL LOGISTICS  
FUNCTIONS**

**MANNING**

**ARMING**

**FUELING**

**FIXING**

**MOVING**

**GENERAL ENGINEERING**

**SUSTAINING SOLDIERS AND  
THEIR SYSTEMS**

**OPERATIONAL PRINCIPLES OF  
LOGISTIC**

**RESPONSIVENESS**

**SIMPLICITY**

**FLEXIBILITY**

**ECONOMY**

**ATTAINABILITY**

**SUSTAINABILITY**

**SURVIVABILITY**

Figure 9

These fundamental functions and principles are dynamic and can apply to any situation that the Army might face. When applied at the theater level, they ensure that the Army commander and his staff have considered all operational level logistics requirements against capabilities and can measure and plan for the shortfalls. Additionally, because these functions and principles nest with joint doctrine, they will ensure that sister services, allies, and interagency requirements are met.

## NOTES

<sup>1</sup> Wilson, Johnnie E., GEN, "The New Millennium: Getting There from Here", Army Magazine, February 1999, p. 19.

<sup>2</sup> United States Code, Title 10, Section 3062,

<sup>3</sup> The Joint Doctrine Encyclopedia, "Levels of War," Joint Electronic Library (JEL), Office of the Chairman, the Joint Chiefs of Staff, Washington, DC, June 1998, p. 458-460. "Levels of command, size of units, types of equipment, or types of forces or components are not associated with a particular level. National assets such as intelligence and communications satellites, previously considered principally in a strategic context, are an important adjunct to tactical operations. Actions can be defined as strategic, operational, or tactical based on their effect or contribution to achieving strategic, operational, or tactical objectives, but many times the accuracy of these labels can only be determined during historical studies. Advances in technology, information age media reporting, and the compression of time-space relationships contribute to the growing inter-relationships between the levels of war. The levels of war help commanders visualize a logical flow of operations, allocate resources, and assign tasks to the appropriate command. However, commanders at every level must be aware that in a world of constant, immediate communications, any single event may cut across the three levels.

<sup>4</sup> Ibid, p. 459.

<sup>5</sup> The Joint Doctrine Encyclopedia, "Levels of War," Joint Electronic Library (JEL), Office of the Chairman, the Joint Chiefs of Staff, Washington, DC, June 1998, p. 458-460.

<sup>6</sup> Ibid, p. 460.

<sup>7</sup> The Joint Doctrine Encyclopedia, "Levels of Logistic Support," Joint Electronic Library (JEL), Office of the Chairman, the Joint Chiefs of Staff, Washington, DC, June 1998, p. 458-458.

<sup>8</sup> Ibid, p. 458.

<sup>9</sup> The Joint Doctrine Encyclopedia, "Key Elements of the Logistic System," Joint Electronic Library (JEL), Office of the Chairman, the Joint Chiefs of Staff, Washington, DC, June 1998, p. 447.

<sup>10</sup> Marine Corps Doctrinal Publication 4, Logistics, Department of the Navy, Headquarters, United States Marine Corps, Washington, DC, 21 February 1997, p. 48-52.

<sup>11</sup> Joint Publication 1-02, Department of Defense Dictionary of Military and

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Associated Terms, Joint Electronic Library (JEL), J-7 of the Joint Staff, CD-ROM, 23 March 1994 (as amended through 12 January 1998), p. 153.

<sup>12</sup> Field Manual 100-1, The Army, Headquarters, Department of the Army, Washington, DC, June 1994, p. 35. FM 100-1, The Army, is "a primer on the history, legal origins, and justification of the Army." This manual provides a foundation for the Army's doctrine. "From our doctrine flows how we think about the world and how we train, equip, and organize our forces to serve the Nation."

<sup>13</sup> Training and Doctrine Command Pamphlet 525-5, "Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century," Department of the Army, Headquarters, Army Training and Doctrine Command, Fort Monroe, VA, 1 August 1994, p. i.

<sup>14</sup> Ibid, p. v.

<sup>15</sup> Department of Defense Directive 5100.1, Functions of the Department of Defense and its Major Components, Department of Defense, Washington, DC, 25 September 1987.

<sup>16</sup> Field Manual 100-16, Army Operational Support, Headquarters, Department of the Army, Washington, DC, 31 May 1995, p. i-ii.

<sup>17</sup> Field Manual 100-7, Decisive Force: The Army in Theater Operations, Headquarters, Department of the Army, Washington, DC, 31 May 1995, p. 5-19 through 5-22 and Appendix A.

<sup>18</sup> Fehrenbach, T. R., "This Kind Of War," US Army Command and General Staff College Press, Fort Leavenworth, KS, 1994, p. 427.

<sup>19</sup> Training Field Manual 101-5, Staff Organization and Operations (Headquarters, Department of the Army, Washington, D. C., 31 May 1997), p. 5-11. Although FM 101-5 establishes the five criteria of suitability, feasibility, distinguishability, and completeness, the practical application of the first three is the accepted practice in the field.

<sup>20</sup> Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, Joint Electronic Library (JEL), J-7 of the Joint Staff, CD-ROM, 23 March 1994 (as amended through 12 January 1998), p. 153.

<sup>21</sup> Training and Doctrine Command Pamphlet 525-5, "Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century," Department of the Army, Headquarters, Army Training and Doctrine Command, Fort Monroe, VA, 1 August 1994, p. 3-1 through 3-3.

<sup>22</sup> Ibid, p. 3-1.

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<sup>23</sup> Ibid, p. 3-2.

<sup>24</sup> Ibid, p. 3-2.

<sup>25</sup> Ibid, p. 3-3.

<sup>26</sup> Field Manual 100-5, Headquarters, Department of the Army, Washington, DC, June 1993, p. 12-3.

<sup>27</sup> Ibid, p. 12-3.

<sup>28</sup> Ibid, p. 12-4.

<sup>29</sup> Ibid, p. 12-5.

<sup>30</sup> Ibid, p. 12-3.

<sup>31</sup> Ibid, p. 12-11.

<sup>32</sup> Ibid, p. 12-11.

<sup>33</sup> Ibid, p. 12-12.

<sup>34</sup> Ibid, p. 12-12.

<sup>35</sup> Ibid, p. 12-12.

<sup>36</sup> Ibid, p. 12-12.

<sup>37</sup> Ibid, p. 12-12.

<sup>38</sup> Ibid, p. 12-12.

<sup>39</sup> Ibid, p. 12-12.

<sup>40</sup> Ibid, p. 12-13.

<sup>41</sup> Joint Publication 4.0, Doctrine for Logistic Support of Joint Operations, Joint Electronic Library (JEL), J-7 of the Joint Staff, CD-ROM, 27 January 1995, p. II-1 through II-4

<sup>42</sup> Ibid, p. II-4.

<sup>43</sup> Ibid, p. II-4.

<sup>44</sup> Ibid, p. II-4.

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<sup>45</sup> Ibid, p. II-4.

<sup>46</sup> Ibid, p. II-5.

<sup>47</sup> Ibid, p. II-5.

<sup>48</sup> Ibid, p. II-5.

<sup>49</sup> Ibid, p. II-4 through II-8.

<sup>50</sup> Ibid, p. I-7.

<sup>51</sup> Ibid, p. I-7.

<sup>52</sup> Ibid, p. I-7.

<sup>53</sup> Ibid, p. I-8.

<sup>54</sup> Ibid, p. I-8.

<sup>55</sup> Ibid, p. I-8.

<sup>56</sup> "characteristic", The Random House College Dictionary, Revised Edition, Jess Stein, Editor in Chief, Random House, New York, 1980, p. 226.

<sup>57</sup> Ibid, "principle", p. 1053.

<sup>58</sup> Field Manual 100-7, Decisive Force: The Army in Theater Operations, Headquarters, Department of the Army, Washington, DC, 31 May 1995, Appendix A.

<sup>59</sup> Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, Joint Electronic Library (JEL), J-7 of the Joint Staff, CD-ROM, 23 March 1994 (as amended through 12 January 1998), p. 250.

<sup>60</sup> Ibid, p. 124.

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